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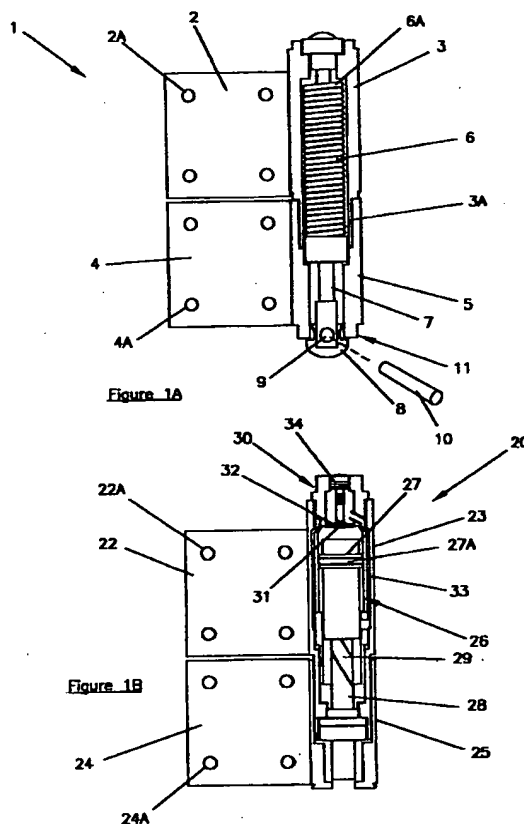
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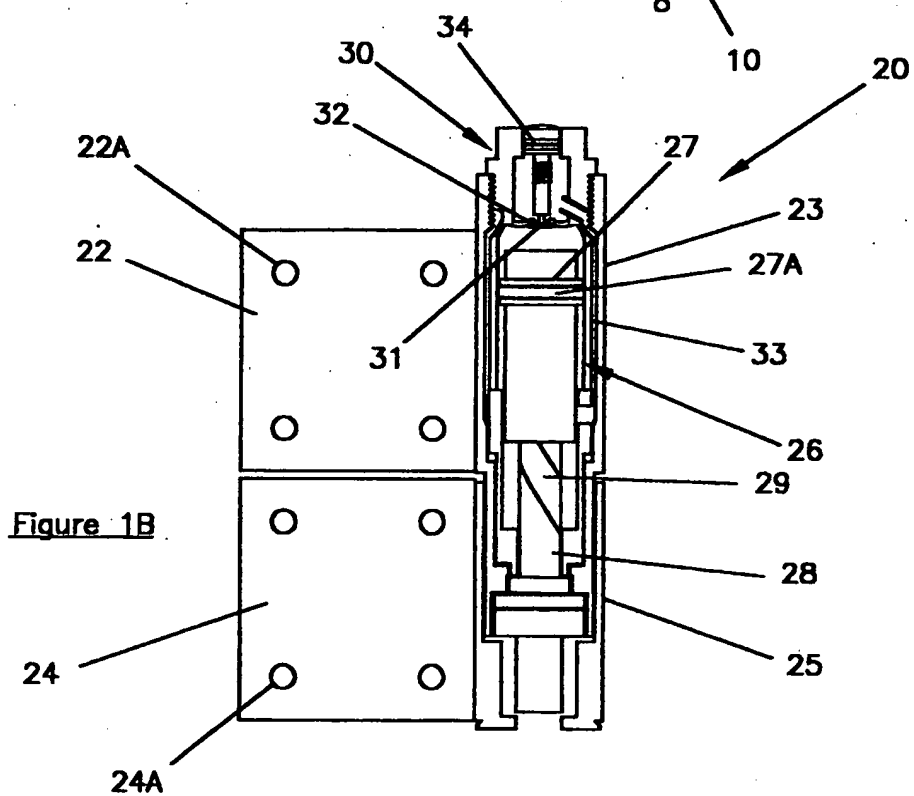
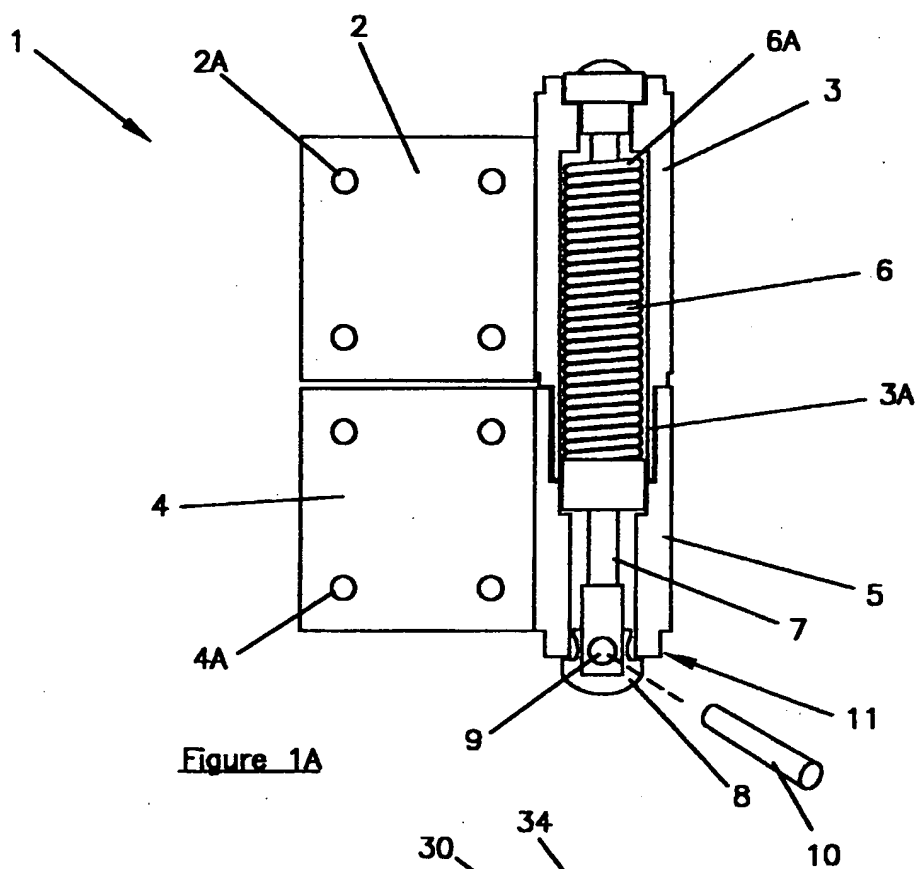
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(54) Abstract Title: Biased door hinge in combination with a dampened door hinge

(57) A pair of door hinges including a first hinge 1 having a spring 6 to bias the first hinge to close a door, and a second hinge 20 to dampen movement of the door. The tension of the spring of the first hinge 1 may be adjustable. Further, the first hinge 1 may comprise a first cylinder 3 with a reduced diameter sleeve 3A that extends into a second cylinder 5 to provide a pivot. The spring 6 may be connected between the first and second cylinders, and may be connectable in variable positions of rotation to adjust the tension of the spring. The second hinge 20 may comprise a first cylinder supporting a chamber 26 containing a piston 27, which moves up and down in the chamber 26 by displacement of hydraulic fluid either side of a piston ring 27A via control valve 30. A second cylinder 25 may support a projection 28 with a helical groove 29 on which the piston slides and rotates to dampen movement of the cylinders.



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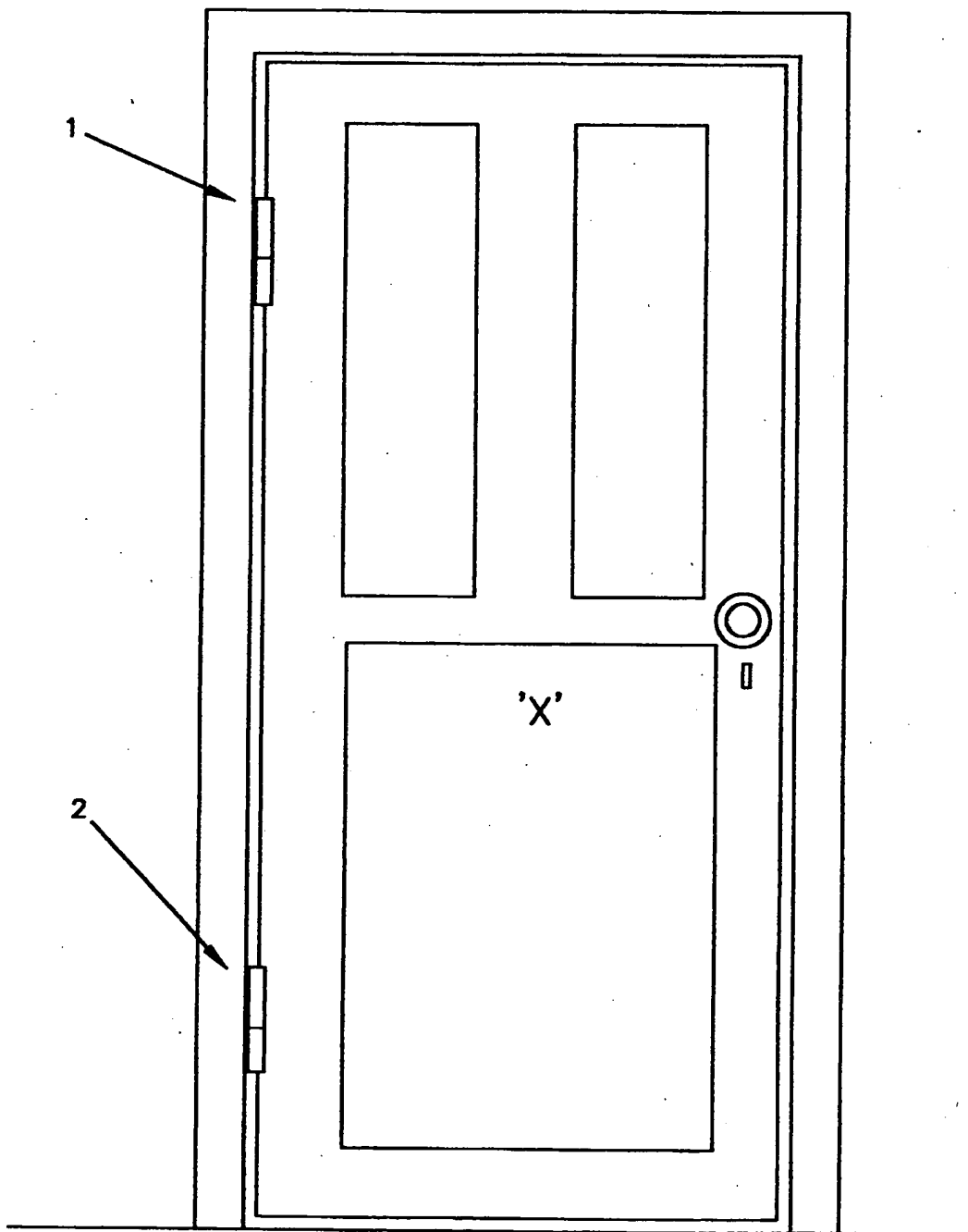


Figure 2

Title: Door Hinges

The present invention relates to a pair of door hinges, and particularly to a pair of door hinges which act as a door-closer device.

Door-closers are well known and usually comprises a box mounted on the top of the door with an arm which rotates extending from the box and having a free end connected to the door frame. The arm is spring biased to close the door, and usually the arm movement is damped by hydraulics.

Known door-closers can be unsightly and offer suffer from the last movement of closing the door being accelerated.

The invention seeks to provide a solution to this problem by providing the door-closer mechanism in at least one hinge.

According to the present invention there is provided a pair of door hinges, a first hinge including a spring to spring bias the first hinge to close a door to which it is attached, and a second hinge to dampen movement of the door as the door is closed by the first hinge.

Preferably the tension of the spring can be adjusted.

In one embodiment the first hinge includes a first flange mounted on a first flange cylinder, and a second flange mounted on a second flange cylinder, and a reduced diameter sleeve extending from the first flange cylinder into the second flange cylinder to provide a pivot point connecting the first and second cylinders together in line, and spring means connected between the first and second flange cylinders. Preferably the spring means is a coil spring inside the first and second flange cylinders, one end of the spring being connected to the first flange cylinder and the other end of the spring is connectable to the second flange cylinder in variable positions of rotation to adjust the tension of the spring means.

In on embodiment the second hinge includes a first flange mounted on a first flange cylinder and a second flange mounted on a second flange cylinder, said first and second flange cylinders being in line and rotating relative to each other on their cylindrical axis, said first flange cylinder supporting a chamber with a piston therein which moves up and down in a chamber by displacement of hydraulic fluid either side of a piston ring, and said second flange cylinder supporting a projection with a helical groove on which the piston slides and rotates, whereby rotational movement of the first and second flange cylinders is damped by movement of the piston on the helical groove. Preferably a control valve is provided to control displacement of fluid from one side of the piston ring to the other.

An embodiment of the invention will now be described with reference to that accompanying drawings in which:

Figure 1A shows a cross section view of the first hinge,

Figure 1B shows a cross section view of the second hinge, and

Figure 2 shows a view of a door with the hinges.

Referring to Figure 1A, there is shown a first hinge 1. First hinge 1 includes a first flange 2 mounted on a first flange cylinder 3 and a second flange 4 mounted on a second flange cylinder 5. First flange 2 is, in use, mounted on a door edge and second flange 4 is mounted on a door frame (or vice versa). Holes 2A and 4A are provided to accept screws or other fasteners for this purpose.

A reduced diameter sleeve 3A extends from the first flange cylinder 3 into the second flange cylinder 5 to provide a pivot point connecting the first and second cylinders together in line and so they rotate relative to each other on their cylindrical axis. A coil spring 6 provides a spring means to spring bias the first hinge 1 to close a door to which it is attached. One end 6A of spring 6 is connected to first flange cylinder 3. The other end of spring 6B is connected to a shaft 7 leading to a hexagonal nut 8 which projects from the end of second flange cylinder 5. Nut 8 includes a pin receive aperture 9 to receive a pin 10, and second flange cylinder 5 includes a groove 11, whereby the pin 10 secures the nut 8 to the second flange cylinder 5.

In use when the hinge 1 is secured to a door, pin 10 can be removed and a spanner can be placed on nut 8 to tension the spring, and then pin 10 being inserted back into groove 11 and aperture 9 to lock the tension in the spring. The other end 6B of the spring 6 is thus connectable to the second flange cylinder in variable positions of rotation to adjust the tension of the spring means.

Referring to Figure 1B there is shown a second hinge 20 to dampen movement of the door as the door is closed by the first hinge 1. Hinge 20 includes a first flange 22 mounted on a first flange cylinder 23, and a second flange 24 mounted on a second flange cylinder 25. First flange 22 is, in use, mounted on a door edge and second flange 24 is mounted on a door frame (or vice versa). Holes 22A and 24A are provided to accept screws or other fasteners for this purpose. First and second flange cylinders 22,24 are in line and rotate relative to each other on their cylindrical axis.

First flange cylinder 23 supports a chamber 26 with a piston 27 therein which moves up and down in chamber 26 by displacement of hydraulic fluid either side of a piston ring 27A.

Second flange cylinder 25 supports an internal projection 28 with a helical groove 29 on which the piston slides and rotates. Rotational movement of the first and second flange cylinders is damped by movement of the piston on the helical groove displacing hydraulic fluid.

A control valve 30 is provided to control displacement of fluid from one side of the piston ring to the other to thereby control the degree of damping. Control valve 30 has valve head 31 which is displaced well off a valve seat 32 when fluid flows from below piston ring 27A through a side channel 33 in the wall of flange cylinder 25, through the top side of valve head 31 to above the piston ring 27A. This makes it easy for the first and second flange cylinders to move relative to each other when the door is opened. Valve head 31 is pushed towards seating 32 when fluid flows from above piston ring 27A, through valve 30, through channel 33 to below the piston ring 27A. This makes it slow for the first and second flange cylinders to move relative to each other when the door is closed creating a controlled damping action. The distance the valve head 31 is spaced from valve seat 32 (when fluid flows from above to below the piston ring 27A) is controlled by valve screw 34 whereby the degree a damping is controlled.

As shown in Figure 2, hinges 1 and 2 may be fitted to a door "X". If three or four hinges are required for a door, extra hinges without a spring or damping mechanism may be used.

The hinges of the invention may be made of any suitable material such as "Duralumin" or other metal or plastic. The invention may take a form different to that specifically described above.

Further modifications will be apparent to those skilled in the art without departing from the scope of the present invention.

CLAIMS

- 1. A pair of door hinges, a first hinge including spring means to spring bias the first hinge to close a door to which it is attached, and a second hinge to dampen movement of the door as the door is closed by the first hinge.**
- 2. A pair of door hinges according to claim 1, wherein the tension of the first hinge spring means can be adjusted.**
- 3. A pair of door hinges according to claim 1 or 2, wherein the first hinge includes a first flange mounted on a first flange cylinder, and a second flange mounted on a second flange cylinder, and a reduced diameter sleeve extending from the first flange cylinder into the second flange cylinder to provide a pivot point connecting the first and second cylinders together in line, and spring means connected between the first and second flange cylinders.**
- 4. A pair of door hinges according to claim 3, wherein the spring means is a coil spring inside the first and second flange cylinders, one end of the spring being connected to the first flange cylinder and the other end of the spring is connectable to the second flange cylinder in variable positions of rotation to adjust the tension of the spring means.**

5. A pair of door hinges according to any preceding claim wherein the second hinge includes a first flange mounted on a first flange cylinder and a second flange mounted on a second flange cylinder, said first and second flange cylinders being in line and rotating relative to each other on their cylindrical axis, said first flange cylinder supporting a chamber with a piston therein which moves up and down in a chamber by displacement of hydraulic fluid either side of a piston ring, and said second flange cylinder supporting a projection with a helical groove on which the piston slides and rotates, whereby rotational movement of the first and second flange cylinders is damped by movement of the piston on the helical groove.
6. A pair of door hinges according to claim 5, wherein a control valve is provided to control displacement of fluid from one side of the piston ring to the other.
7. A pair of door hinges substantially as hereinbefore described with reference to and as shown in the accompanying drawings.



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Examiner: Catherine Jones

Claims searched: 1-7

Date of search: 18 January 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-6	EP 1347138 A2 (LEE) - see particularly the figures and paragraphs 0018-0038
X	1 & 2	JP 2002206369 A (SAWA) - see particularly the figures
X	1 & 2	JP 03129078 A (FUJI) - see particularly the figures
X	1 & 2	JP 05005389 A (DAIHATSU) - see particularly the figures
X	1 & 2	JP 08093309 A (NIPPON) - see particularly the figures

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^x:

E2F

Worldwide search of patent documents classified in the following areas of the IPC

E05F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

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TITLE: Biased door hinge in combination with a dampened door hinge

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ABSTRACT:

CHG DATE=20060602 STATUS=O>A pair of door hinges including a first hinge 1 having a spring 6 to bias the first hinge to close a door, and a second hinge 20 to dampen movement of the door. The tension of the spring of the first hinge 1 may be adjustable. Further, the first hinge 1 may comprise a first cylinder 3 with a reduced diameter sleeve 3A that extends into a second cylinder 5 to provide a pivot. The spring 6 may be connected between the first

and second cylinders, and may be connectable in variable positions of rotation to adjust the tension of the spring. The second hinge 20 may comprise a first cylinder supporting a chamber 26 containing a piston 27, which moves up and down in the chamber 26 by displacement of hydraulic fluid either side of a piston ring 27A via control valve 30. A second cylinder 25 may support a projection 28 with a helical groove 29 on which the piston slides and rotates to dampen movement of the cylinders.